PATENT
Attorney Docket No. 1435-193

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	
Claudine Lalanne-Magne et al.	Group Art Unit: 1764
Application No.: 10/509,884	Examiner: In Suk C. Bullock
Filed: October 4, 2004	
For: Process for the Gas-Phase (Co-)Polymerisation of Olefins in a Fluidised Bed Reactor	Confirmation No.: 9757

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

REPLY

In reply to the Office Action dated June 27, 2007, Applicants' invention, as set forth in claim 1, relates to a process for the gas-phase (co-)polymerization of olefins in a fluidized bed reactor using a Ziegler-Natta type catalyst, said process comprising the addition into the reactor of an organoaluminium cocatalyst and of a monohalogenated hydrocarbon compound,

a . wherein the molar ratio of the monohalogenated hydrocarbon compound to the cocatalyst is comprised between 0.02 and 0.2,

b. wherein the monohalogenated hydrocarbon compound is added to the reactor in an amount comprised between 0.1 to 40 moles of monohalogenated hydrocarbon compound per mole of transition metal of catalyst introduced into the reactor, and

c. wherein the monohalogenated hydrocarbon compound is n-butyl chloride.

Applicants found that this new method of operating the reactor increases the level of polymerization activity of the Ziegler-Natta type catalyst during the (co-)polymerization of olefins, especially ethylene, and improves the processability of the polymer produced. See page 2, line 30 to page 3, line 18 of the specification. See also Examples 1-4 where n-butyl chloride was continuously fed to the reactor at a rate of from 14 to 39 of mmol/hr and at a molar ratio of from 0.05 to 0.15 of the chloride to the cocatalyst, which was triethylaluminium.

In the Office Action the Examiner rejected claims 1-13 under 35 U.S.C. §103(a) for being obvious over U.S. Patent No. 5,990,251 to Gelus. This reference belongs to the same assignee as the present application, so Applicants are well familiar with the teachings of this reference.

Gelus relates to a process for polymerizing olefin(s) in the presence of a Ziegler-Natta type catalyst and particularly to the use of halogenated hydrocarbon compounds as catalyst activating agents in an olefin polymerization process in the presence of a titanium-based catalyst of Ziegler-Natta type.

In column 2, lines 21-37 in Gelus, a large number of possible halogenated hydrocarbons are disclosed. In particular, the reference discloses that "the halogenated hydrocarbon compound may be a chlorinated or brominated hydrocarbon. It may be a monohalogenated hydrocarbon, e.g., corresponding to the general formula R-X in which R denotes an alkyl group containing from 1 to 10, preferably from 1 to 4 carbon atoms, an aralkyl or aryl group containing from 6 to 14, preferably from 6 to 10 carbon atoms, and X denotes a halogen atom such as chlorine or bromine. The halogenated

hydrocarbon compound may also be a polyhalogenated hydrocarbon, preferably containing 2 to 6, e.g., 2 to 4 halogen atoms such as chlorine or bromine, and 1 to 14, e.g., 1 to 4 carbon atoms per 1 molecule. Preferably it may also be a mono- or poly halogenated saturated hydrocarbon, such as the halogenated hydrocarbon compounds previously mentioned, e.g., methylene chloride, chloroform, carbon tetrachloride, trichloro-1, 1, 1 ethane or dichloro-1,2 ethane. Chloroform is employed most frequently."

As the Examiner notes, the reference does not explicitly mention "n-butyl chloride" as the halogenated hydrocarbon. Although it falls within the general formula R-X, relatively "light" halogenated hydrocarbons are preferred (col. 2, lines 32-37) and all examples of Gelus use chloroform as the halogenated hydrocarbon compound.

As the Examiner further notes: a "difference between Gelus and the claimed invention is that the molar ratio ranges disclosed by Gelus overlap with the claimed molar ranges." The present invention requires a molar ratio of a n-butyl chloride to transition metal of the catalyst of between 0.1 to 40. Gelus discloses a halogenated hydrocarbon to catalyst transition metal molar ratio at its broadest of 0.001 to 0.15 (col. 2, lines 42-47). The preferred ranges have an upper limit less than 0.1. More particularly, and as listed in the table below, all of the examples of Gelus have ratios (of chloroform to catalyst transition metal) below 0.1, i.e., below the requirement of claim 1 of the present application.

Ex/run	1	3B	3C	3D	4H	4I	4J	5	7	9
Molar ratio	0.043	0.043	0.068	0.091	0.031	0.052	0.085	0.05	0.08	0.08

In fact, Gelus even teaches away from the significantly higher molar ratios of the present invention since Comparative Example 3E of Gelus clearly shows the drawback of using higher ratios, i.e., 0.176 at least for chloroform. This is represented visually in Figure 2 in Gelus.

In contrast, the Examples of the present invention all have ratios significantly above these numbers.

Example	1	2	3	4
Molar ratio	2.5	0.6	8.2	8.1

The molar addition rate of Ti can be calculated using the Ti content of the initial catalyst and its introduction rate or the Ti content of the product polymer and its production rate. The latter has been used for consistency for all four examples in the numbers above, but a consistent result is obtained from Examples 1 and 2 using the information about the catalyst provided in the Examples.

Thus the present invention requires not only the selection of n-butyl chloride from all the other options for the halogenated hydrocarbon listed in Gelus, but also to then select a ratio of n-butyl chloride to Ti above the preferred range and exemplified values of Gelus.

It is submitted that, despite the Examiner's comments, the selection of both of these features would not be obvious in view of the teaching of Gelus, especially in view of the preference in Gelus for a much lower ratio of chlorinated hydrocarbon to catalyst and the explicit teaching away from increased ratios in the Examples. As noted in M.P.E.P. §2144.05III, a prima facie case of obviousness may be rebutted by showing

"that the art, in any material respect, teaches away from the claimed invention." Clearly a teaching, evidenced by a comparative example (i.e., Example 3E of Gelus) that ratios above 0.1 should be avoided, is a teaching away from the claimed invention which includes ratios of from 0.1 all the way up to 40.

Withdrawal of Gelus as a ground of rejection under §103(a) and allowance of claims 1-13 is therefore requested.

Please grant any extensions of time required to enter this Reply and charge any additional required fees to Deposit Account 06-0916.

Respectfully submitted,

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